

FRACKING OPERATIONS

FireStopper Marketing Department

GLOBAL APPLICATION OF FireStopper® PRODUCTS

WHITE PAPER

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Preface

FireStopper International Limited, a transnational Registered Company, is the developer of the most advanced and powerful firefighting technology in the “World”. It devoted the first 25-years of its existence to R&D and the recipient of subsequent stand alone testing results in ratings and certifications by the most recognized and respected third-party testing and listing facilities in the world.

Moreover, this unique Technology has rendered the only available all fire class effective and anti-explosive products, which are non-toxic, non-irritant, environmentally safe and non-hazardous over all other existing and available products in the fire and safety channel of business.

Having proven the former statement through the outstanding results of the products testing, rating, and certifications thus received, FireStopper®, in tandem with its novel firefighting and anti-explosion products (the “software”), developed the most durable and reliable supporting hardware and detection systems available today, which also meet and exceed the relative standards used to certify said product lines.

Moreover, the FireStopper® lines of products reach across the full spectrum of safety application including environmental remediation post spills both onshore and offshore.

In the International arena, the FireStopper® brand is the recipient of the highest certifications in all category of Governmental requirements to market such as defined below:

Handheld Portable Extinguishers:

*ANSI/UL711, ULC – Southwest Research Institute (San Antonio, TX)
Defense Logistics Agency (DLA) US Gov. NSN Approval #s’*

*EN3-7; EN3-8¹ – MPA, Dresden (Germany)
CE² – DNV*

Firefighting Foam Concentrates:

*EN1568 – MPA Dresden
ICAO – CNPP (France)
IMO – MPA Dresden, Lloyds Registry, DNV, MED
CE*

Environmental Testing:

*NAMSA, USA
Associated Laboratories, CA USA
Environmental Medicine, Inc., USA
OPUS, Ltd., UK*

¹ This Standard refers to hardware durability, reliability and efficacy

² This Mark assures manufacturing quality through yearly inspections

Executive Summary

Since Hydraulic Fracturing operations can virtually take place globally, until now, the support industry for these operations could not offer an economic solution, both in time, effort, and cost, to deliver total safety.

With the introduction of the FireStopper® FFC (Fire Fighting Catalyst) Technology and its branch technology EnviroSafe®, Fracking can now implement a full safety program that not only undertakes complete fire protection, explosion detection and amelioration in addition to the most complete environmental hazard protection while operating its intended product extraction.

FireStopper® provides full design, engineering, and installation of portable and fixed systems, that provide the quickest extinguishment of fire, detect and deploy anti-explosive FireStopper® product thereby vastly reducing the effects of both fire and explosion destruction.

The FireStopper® detection systems for explosion suppression detect in less than 5-microseconds and deploy in less than 50-msec to reduce the explosive event to its minimal progression. In the case of fire, our detectors will detect and deliver in less than 100-msec to eliminate the fire while reducing the temperature to ambient within the extinguishing and deployment time. No other available products can approach the reliability FireStopper® brings with its total products.

In the present economic environment where the cost of industry outpaces profit margins, no operation can afford to loose its infrastructure to a fire or explosion event. FireStopper® is the only company that offers its wares exclusively in stainless steel for long-term reliable usability and durability (most products carry a 20-year Limited Warranty) over all other manufactures.

PRODUCTS AND APPLICATION

FIRE EXTINGUISHING LIQUID PRODUCTS

- All fire class effective ABCDK
- Non-Toxic, Non-Hazardous, Eco-Safe according to HOCNF (Harmonized Offshore Chemical Notification Format and *FHSA regulations, 16 CFR 1500 and California Proposition 65*) **will meet and exceed all environmental requirements for fire safety products**
- ***FireStopper® XL “PLUS” FFC (1%, 3%, 6% usable concentrate):***

Advantages:

- This product is the highest rated product for fire efficacy in the world as determined by the international certification under EN1568, IMO, and ICAO by MPA Dresden and CNPP, France (for more information please see product sheet).
- Meet or exceed UL162
- Storage temperature resistance: -34.5°C
- This product is ideal for fixed and portable system, e.g.: deluge system, proportioned systems, hand-line systems, compressed air systems, and multiple product system (although multiple products are not necessary).

- When independently tested head to head against Tyco Chemguard foam, in a simulated Fracking Pump truck environment, FireStopper® XL FFC, the midrange product in the concentrate line, delivered 10-times faster extinguishment with no possible re-ignition in contrast with the easily re-ignitable Chemguard exemplar.

Fig. 1

PRODUCT EFFICACY COMPARISON
FireStopper® XL FFC vs. Tyco Chemguard

Fracking Pump Vehicle Protection
Flammable Area Simulation
(Commissioned by Lewis Energy Group)

Simulated Fire Area and Fuel:

- 8'X8'X8'
- 8-nozzles
- Diesel and gasoline
- **Additional Information:**
- An attempt to reignite the extinguished fuel on both exercises (not shown)

Conclusion:

FireStopper® XL FFC @ 3% extinguished the fire in approx. 2.6-sec

- Total spray time: <5-sec

Chemguard @ 3% extinguished the fire in approx. 13-sec

- Total spray time: approx. 19-sec

Post Fire Result:

FireStopper®:
No re-ignition possible

Chemguard: once flame was applied to exposed fuel re-ignition was obtained; foam closed the opened gap and fuel was extinguished

Fig. 2

FireStopper® XL FFC vs. TYCO CHEMGUARD AFFF
(Head To Head On Camera Video Comparison Demo @ Lewis Energy)



Video: @ 0 seconds



@ 2 seconds



@ 3 seconds

TYCO/CHEMGUARD



Video: @ 0 seconds



@ 4 seconds



@ 17 seconds

Full Video Comparison Available Upon Request:

ADDITIONAL PRODUCTS

- **FireStopper® PFE-FR FFC** (a premix exclusively available with for use in conjunction with FireStopper® trademarked systems)

Advantages:

- This product is designed for use exclusively with FireStopper® trademarked systems and delivers:
 - Full efficacy on all fire class and subclasses
 - -100°F freeze resistance while in use without harmful antifreeze additives
 - Viscosity: water-thin
 - Anti-explosive properties
 - Highest ratings in the world both: EN3-7 & UL7-11
 - Highest Eco-Safety testing results under HOCNF, and meet or exceed *FHSA regulations, 16 CFR 1500 and California Proposition 65*
 - Ideal for use where extreme cold temperatures may be a factor
 - The ideal product for use in concert with FireStopper® CAC (Compressed Air Catalyst) units; please see CAC Catalog

- **FireStopper® EXP FFC** (a premix exclusively available with for use in conjunction with FireStopper® trademarked systems)

Advantages:

- *The only proven product effective on Hydrogen/Methane explosions (at Gexcon, Norway)*
- *Non-toxic, non hazardous and non-corrosive*

- Biodegradable/Environmentally Safe
- Super anti-explosive properties
- No unpleasant odor
- Great temperature reduction i.e.
($>1500^{\circ}\text{F}$ in < 40 sec.)
- Freeze Resistant: -100°F (-73.33°C)

Applications through FireStopper® Systems

- Petrochemical Industry
- Tires & Rubber
- Vehicles: Interiors And Exteriors
- Military
- Transformers
- Mines
- Transportation
- Warehousing
- Marine
- Structural
- Aero Space
- Cargo Holds
- & More...

This FireStopper® derived ENVIRO-SAFE® Technology is the next generation FireStopper® Technology. ***EXP (FFC)*** is designed with exclusive properties that combine multiple fire suppression, endothermic and barrier production environments, to deliver the anti-explosive protection necessary to prevent the expansion of the pressure wave.

In addition, the *FFC Products* are the only ***A, B, C/E, D, & K / F*** fire-fighting products in the market that deliver faster knockdown, no flash back, faster cool down and fully reliable post fire security. ***EXP (FFC)*** incorporates said properties to enhance post-explosive security.

- ***EnviroSafe® TCC (FFC)*** (A Concentrate: best usage to be determined by the end user)

Advantages:

- ENVIROSAFE® H₂O BASED CHEM (A High Kinetic Active Foamer, An Aqueous Lubricant, & Endothermic Clean Agent)
- Meet and exceed HOCNF, and all other environmental requirements
- USAGE: AS A DRILLING MUD REPLACEMENT AGENT
- OTHER USES:
 - Can be used to replace the array of Fracking chemicals employed in the hydrocarbon extraction process

- ***EnviroSafe® EBC (FFC)*** (Environment Bio-Remedial Catalyst) Agent

APPLICATIONS:

ENVIRO-SAFE® EBC OIL DISPERSING AND PENETRATING PROPERTIES CAN BE APPLIED TO ANY OIL SPILL WHETHER ON LAND, GARMENTS, EQUIPMENT, OR ON WATER SURFACES. NO SPECIFIC VOLUMES ARE DETERMINED OR RECOMMENDED BY THE MANUFACTURER. USER SHALL DETERMINE BY PRACTICAL EXPERIENCE SUCH

VOLUMES NECESSARY TO DISPERSE THE REQUIRED TASK. NOTWITHSTANDING, THIS FireStopper® SPECIAL PRODUCT CAN TREAT THE "TRAILING PONDS", PREVALENT TO FRACKING OPERATIONS, WITH THE ABILITY TO REMEDIATE SAID CONTAMINATION EVENT.

Advantages:

- EASY TO APPLY THROUGH NORMAL FIRE FIGHTING HOSE AND NOZZLES
- CONCENTRATE (*A High Kinetic Active Foamer*)
- USAGE: 6% or as required
- NON-FLAMMABLE
- ECO-SAFE
- NON-TOXIC
- NON-FLAMMABLE
- VAPOR SUPPRESSANT
- TESTED BY BP TO ELIMINATE TAR BALLS
- PLEASE SEE ADDITIONAL PRODUCT INFO UPON REQUEST

- **EnviroSafe® ECC (FFC)**

APPLICATIONS:

As a Drilling Mud replacement, an aqueous lubricant and environment temperature control liquid compound, pressure suppressant, fire suppressant and anti-explosive agent. Derived from the ENVIRO-SAFE® H₂O based chemistry (a highly kinetic, temperature absorbing and diffusing, Non-Toxic, environmentally safe agent)

ECC (FFC) is designed with exclusive properties that combine multiple fire suppression, temperature control properties and barrier production environments, that deliver the necessary environment to prevent uncontrolled expansion of temperature and pressure among other desirable environment stabilization capabilities.

Advantages:

- *Non-toxic, non hazardous and non-corrosive*
- *Biodegradable/Environmentally Safe*
- *Super anti-explosive properties*
- *No unpleasant odor*
- *Great temperature reduction i.e.*
(>1500°F to <120°F in < 40 sec.)
- *Freeze Resistant: -100°F (-73.33°C)*
- *SG: 1.2 – 1.3 pH: 7.0 – 7.9*
- *Storage Temp: -10°C to 34.5°C*
(14°F to 120°F)
- *Usable Temp: -40°C to > 65.5°C*
(-40°F to >150°F)

- **EnviroSafe® TCC (FFC)**

APPLICATIONS:

This EnviroSafe® H₂O based chemistry (a high kinetic active foamer and clean agent) is designed for use as a replacement of Fracking chemicals employed in the hydrocarbon extraction process. A 6% Concentrate (usable at 6 – 100% to be determined by the end user) with exclusive properties that combine multiple fire suppression and barrier production environments, to deliver deep penetration with tremendous endothermic capability, to reduce environment temperature due to friction, and other circumstances and obviate these extremely hazardous and dangerous conditions.

Advantages:

- Non-toxic, non hazardous and non-corrosive
- Biodegradable
- Extremely low surface tension
- Great temperature reduction e.g.
(>1500°F to 130°F in < 40 sec.)
- Concentrate Freeze Resistant: -2°F (-19°C)
- Usable Temp: -18°C (*full strength*)
-2°C @ 6% to > 65.5°C
(-0.4°/28°F to >150°F)

Conclusion

Responsibility to provide safety is owed to the public by both Government and Industry. In current profound social and economic conditions, Government, Industry and the consumer cannot afford the risk of loss both materially and always risk to life. FireStopper® offers the only real security against the always present danger of serious environmental degradation, catastrophic fire and or worst, explosion.